

U.S. Department of Labor

Mine Safety and Health Administration
Industrial Park Road
RR 1, Box 251
Triadelphia, West Virginia 26059



Advanced Notification Date 09-08-98

November 30, 1998

Reply to Attn of:
MSHA:A&CC:PAR 81202

Victor Products, USA
Attention: Mr. Barry Wilson
P.O. Box 517
Warrendale, Pennsylvania 15086

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to amendments

Gentlemen:

This refers to your letter dated May 24, 1996, your assigned Code No. 000086, requesting intrinsic safety evaluation of the Trolex Model TX9042 Programmable Sensor Controller.

The examination of drawings and specifications, and inspection and tests have been satisfactorily completed and this Trolex Model TX9042 Programmable Sensor Controller meets the applicable requirements of Title 30 Code of Federal Regulations, Section 18.68 (30 CFR Section 18.68) under the following conditions:

1. The Trolex Model TX9042 Programmable Sensor Controller must be constructed and maintained in accordance with the drawings and specifications on file at the Mine Safety and Health Administration. A list of these drawings and specifications is enclosed.
2. The installation shall preclude intermingling between intrinsically safe circuits, including their associated wires and cables, and all other circuits, wires, and cables.
3. The power supply must be favorably evaluated for intrinsic safety by MSHA and have the following specifications:
 - a) Maximum output voltage-12 VDC.
 - b) Maximum output current-2 amperes.
 - c) floating output not requiring grounding for intrinsic safety.
4. The NAMUR devices connected to the input modules are not evaluated here; connection to these devices must be separately evaluated by MSHA.
5. Connection to the Comms Modules has not been evaluated here; these connections must be separately evaluated by MSHA.
6. The Optional Xenon Flashing Beacon, I.S. Version has not been evaluated here; it must be separately evaluated by MSHA.

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7. The loads switched by the relays on the Control PCB must not exceed 2/3 of the relay's ratings.
8. The Trolex TX9042 Programmable Sensor Controller shall include an intrinsic safety evaluation label that include the following:
 - a. The manufacturer's name, the intrinsic safety evaluation number, the model or part number, and the generic name of the assembly.
 - b. A list of the applicable conditions of use or a reference to the document that lists the conditions of use.
9. If the digital (on/off) sensors connected to the Trolex TX9042 Programmable Sensor Controller are connected to other electrical equipment, connection to these devices must be separately evaluated by MSHA.
10. Machine approval requests incorporating this Programmable Sensor Controller shall be subject to an evaluation of operator safety due to the system's use of microprocessor control technology.

Victor Products, USA is obligated to inform its customers, distributors, and end users of this Trolex TX9042 Programmable Sensor Controller of the foregoing conditions of use.

Any change in the design herein investigated must be approved by the Mine Safety and Health Administration before such changes are incorporated into the Trolex TX9042 Programmable Sensor Controller.

The continuance of this evaluation, including all subsequent extensions of evaluation which may be made to cover changes in design, is contingent on future execution of such modifications as may prove necessary in the interests of safety.

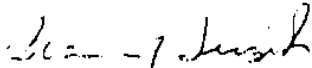
A report of this investigation is filed under Investigation No. IA-17501 at the Approval and Certification Center. Reference may be made to Evaluation No. IA-17501-0 as evidence that the Mine Safety and Health Administration has evaluated the Trolex TX9042 Programmable Sensor Controller for intrinsic safety according to the requirements of 30 CFR Section 18.68. However, this letter does not authorize Victor Products, USA to advertise the Trolex TX9042 Programmable Sensor Controller as permissible for use in underground gassy mines or as being approved or certified by the Mine Safety and Health Administration.

The Mine Safety and Health Administration reserves the right to rescind for cause, at any time, the permission to use this Trolex TX9042 Programmable Sensor Controller.

An invoice for the cost of this action will be forthcoming.

If you have any comments or questions relative to this letter, please refer them to Kevin Hedrick at 304-547-2018.

Sincerely,



Steven J. Luzik
Chief, Approval and Certification Center

Enclosure

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Data Sheet No. 6
By: KLHedrick
Date: 11-30-98

INVESTIGATION IA-17501DRAWING LIST

Victor Products, USA
Trolex Model 9042 Programmable Sensor Controller
Intrinsic Safety Evaluation

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>REVISION</u>
System Drawing	P5423.123	B
General Arrangement	P5423.202	C
Power Supply PCB Certified Circuit Diagram	P5423.209	A
Power Supply PCB Artwork	P5423.06 (4 Sheets)	A
Control PCB Certified Circuit Diagram	P5423.201 (Sheet 1)	B
Control PCB Certified Circuit Diagram	P5423.201 (Sheet 2)	A
Control PCB Artwork	P5423.03 (6 Sheets)	C
Input PCB Certified Circuit Diagram	P5423.207	B
Input PCB Artwork	P5423.04 (4 Sheets)	B
Display PCB Certified Circuit Diagram	P5423.208	A
Display PCB Artwork	P5423.05 (4 Sheets)	A
Battery PCB Certified Circuit Diagram	P5423.247	A
Battery PCB	P5423.29 (4 Sheets)	A

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<u>TITLE</u>	<u>DRAWING NO.</u>	<u>REVISION</u>
AC (rms) Analogue Input Module Certified Circuit Diagram	P5423.243	C
AC (rms) Analogue Input PCB Artwork	P5423.23 (5 Sheets)	C
AC (Peak) Analogue Input Module Certified Circuit Diagram	P5423.244	A
AC (Peak) Analogue Input PCB Artwork	P5423.30 (5 Sheets)	A
DC Analogue Input PCB Certified Circuit Diagram	P5423.241	B
DC Analogue Input Module PCB Artwork	P5423.21 (4 Sheets)	A
Strain Gage Input PCB Certified Circuit Diagram	P5423.204	B
Strain Gauge Input Module	P5423.131 (7 Sheets)	B
Digital Input (Fail Safe) PCB Certified Circuit Diagram	P5423.205	A
Digital Input Module (Fail Safe) Circuit Diagram	P5423.135 (5 Sheets)	A
Thermocouple Input Module	P5423.206	A
PCB Artwork Thermocouple Input Module	P5423.25	A
Digital Input PCB Certified Circuit Diagram	P5423.242	A
Digital Input PCB	P5423.22 (4 Sheets)	A
RS485 Comms PCB Certified Circuit Diagram	P5423.245	A

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<u>TITLE</u>	<u>DRAWING NO.</u>	<u>REVISION</u>
RS 485 Comms PCB	P5423.27 (4 Sheets)	A
Digital Comms PCB Certified Circuit Diagram	P5423.246	A
Digital Comms PCB	P5423.28 (4 Sheets)	A
Reed Relay	P5093.27	-

The following drawings apply to the Optional TX3250
Series Gas Sensors

Circuit Diagram	P5210.1	A
General Arrangement	P5210.2	A
PCB Master Side A	P5210.3.1	A
PCB Component Ident Side B	P5210.3.2	A
PCB Master Side B	P5210.3.3	A
PCB Component Ident Side A	P5210.3.4	A

The following Drawings apply to the Optional TX3269
Oxygen Sensor

Circuit Diagram Signal PCB	P5443.01	A
Signal PCB Artwork	P5443.03	A

The following drawings apply to the Optional TX1320
Series Airflow Sensor

Circuit Diagram	P5273.1	A
General Arrangement	P5273.2	A
Master Side A	P5273.3.1	A
Component Ident B	P5273.3.2	A
Master Side B	P5273.3.3	A
Component Ident Side A	P5273.3.4	A
Master Side A	P5273.4.1	A
Component Ident Side B	P5273.4.2	A
Master Side B	P5273.4.3	A

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<u>TITLE</u>	<u>DRAWING NO.</u>	<u>REVISION</u>
Component Ident Side A	P5273.4.4	A

The following drawings apply to the Optional TX6100
Series Pressure Sensor

Circuit Diagram	P5234.1	D
General Arrangement	P5234.2	B
LCD Circuit Diagram	P5234.3.1	A
DPM500S Circuit Diagram	P5234.3.2	A
Artwork	P5234.4	B
Artwork	P5234.5.1	A
Artwork	P5234.5.2	A
Artwork	P5234.5.3	A
Artwork	P5234.5.4	A

The following drawings apply to the Optional TX6021
Liquid Flow Sensor

Circuit Diagram	P5438.01	A
General Arrangement	P5438.02	A
PCB Artwork	P5438.05	A

The following drawings apply to the Optional TX3267
Explosive Gas Sensor

Circuit Diagram of Output PCB	P5269.1.1	A
Circuit Diagram of Power Supply Module	P5269.1.2	A
General Arrangement	P5269.2	A
Output PCB Side A	P5269.3.1	A
Output PCB Component Ident Side B	P5269.3.2	A
Output PCB Side B	P5269.3.3	A
Output PCB Component Ident Side B	P5269.3.4	A
PSU 1 PCB Side A	P5269.4.1	A
PSU 1 PCB Component Ident Side B	P5269.4.2	A

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<u>TITLE</u>	<u>DRAWING NO.</u>	<u>REVISION</u>
PSU 1 PCB Component Ident Side A	P5269.4.4	A
PSU 2 PCB Side	P5269.5.1	A
PSU 2 PCB Component Ident Side B	P5269.5.2	A
PSU 2 PCB Component Ident Side A	P5269.5.4	A
Manufacturing Schedule	P5156.1004 (3 Sheets)	C
Head	P5156.16	D
Carrier	P5156.18.1	-
Arrangement of Sensor Head	P5156.48	B

(Optional) Trolex Model TX3240 Series Gas Sensors:
Intrinsically safe under Investigation No. IA-649-0.

(Optional) Trolex Model TX3266 Methane Sensors:
Intrinsically safe under Investigation No. IA-651-0.

Factory Inspection Form: See letter from S.J. Ward,
dated October 17, 1996.

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Revised Approval Modification Program (RAMP) Acceptance issued to:

Company: Trolex Ltd.	Investigation No.: IA-17501
Attention: Mr. Phil Childs	IS Evaluation No. IA-17501-0
Address: Rake Lane Newby Road Hazel Grove, Stockport Cheshire SK7 5DY United Kingdom	Co App. Code No.: <u>904206</u>
	PAR No.: <u>0093232</u>

Model(s): TX9042 Programmable Sensor Controller

Description of change(s): The changes include updated circuitry, PCB layouts and artwork, and new sensors. See RAMP Evaluation Report (attached). The specific changes are as follows:

1. Reed Relay - added a normally open contact option.
2. TX9042 System connections
 - a. Designated the use of the Trolex TX6636 Power supply, MSHA 18-ISA080006-0.
 - b. Allows the optional connection of two TX9024 systems at the RS485 Comms modules.
 - c. Specifies MTL barriers covered in IA-21034 for use with unspecified safe area equipment.
 - d. Removed notes regarding connections to unspecified hazardous area devices.
 - e. Removed note regarding the frame grounding of the wire and added details as to the exact ground wire connections.
3. Added drawing number P5423-570 to address documentation concerns for the LCD module that comply with APOL2048.
4. Added the optional Trolex TX5630 Vibration Sensor.
5. Added the TX6145/6/7/8 (Rosemount 3051S) Sensor covered in IA-18031-0.
6. Added the TX6114 Pressure Sensor covered in IA-18031-0.

Trolex TX9042

Title	Drawing No.	Revision	Status
Reed Relay	P5093.27	C	On File
Reed Relay	P5093.27.01	A	New
Control PCB Certified Circuit Diagram	P5423.01, 2 sheets	D	New
General Arrangement	P5423.02	I	New
Control PCB Artwork	P5423.03	D	Revised

Title	Drawing No.	Revision	Status
Input PCB Artwork	P5423.04	C	Revised
Display PCB Artwork	P5423.05	B	Revised
PCB, Power Supply	P5423.06	J	Revised
Input PCB Certified Circuit Diagram	P5423.07	C	New
Display PCB Certified Circuit Diagram	P5423.08	B	New
Certified Circuit Diagram Power Supply PCB	P5423.09, 2 sheets	J	New
DC Analog Input Module PCB Artwork	P5423.21	B	Revised
Digital Input Module PCB Artwork	P5423.22	D	Revised
AC (RMS) Analog Input Module PCB Artwork	P5423.23	F	Revised
Digital Comms PCB Artwork	P5423.28	B	Revised
Battery PCB Artwork	P5423.29	C	Revised
DC Analog Input Module Certified Circuit Diagram	P5423.41, 2 sheets	B	New
Digital Input Module Certified Circuit Diagram	P5423.42, 2 sheets	C	New
AC (rms) Analog Input Module PCB Certified Circuit Diagram	P5423.43	E	New
RS 485 Comms PCB Certified Circuit Diagram	P5423.45	D	Revised
Digital Comms PCB Certified Circuit Diagram	P5423.46	B	New
Battery PCB Certified Circuit Diagram	P5423.47	B	New
Option 1 System Drawing sht 1 of 2	P5423.123, sheet 1 of 2	D	New
Option 1 System Drawing sht 2 of 2	P5423.123, sheet 2 of 2	D	New
Strain Gauge Input Module PCB Artwork	P5423.131	C	Revised
Fail Safe Digital Input Module PCB Artwork	P5423.135	B	Revised
Strain Gauge Input Module	P5423.138, 2 sheets	C	New
Digital Input (Fail Safe) Module Certified Circuit Diagram	P5423.139, 2 sheets	B	New
Flow Sensor Input Module Certified Circuit Diagram	P5423.178, 2 sheets	B	Revised
Flow Sensor Input Module? PCB Artwork	P5423.179	B	Revised
RS 485 Comms? PCB Artwork	P5423.254	D	Revised

Title	Drawing No.	Revision	Status
Input PCB Artwork	P5423.04	C	Revised
Display PCB Artwork	P5423.05	B	Revised
PCB, Power Supply	P5423.06	J	Revised
Input PCB Certified Circuit Diagram	P5423.07	C	New
Display PCB Certified Circuit Diagram	P5423.08	B	New
Certified Circuit Diagram Power Supply PCB	P5423.09, 2 sheets	J	New
DC Analog Input Module PCB Artwork	P5423.21	B	Revised
Digital Input Module PCB Artwork	P5423.22	D	Revised
AC (RMS) Analog Input Module PCB Artwork	P5423.23	F	Revised
Digital Comms PCB Artwork	P5423.28	B	Revised
Battery PCB Artwork	P5423.29	C	Revised
DC Analog Input Module Certified Circuit Diagram	P5423.41	B	New
Digital Input Module Certified Circuit Diagram	P5423.42, 2 sheets	C	New
AC (rms) Analog Input Module PCB Certified Circuit Diagram	P5423.43	E	New
RS 485 Comms PCB Certified Circuit Diagram	P5423.45	D	Revised
Digital Comms PCB Certified Circuit Diagram	P5423.46	B	New
Battery PCB Certified Circuit Diagram	P5423.47	B	New
Option 1 System Drawing sht 1 of 2	P5423.123, sheet 1 of 2	D	New
Option 1 System Drawing sht 2 of 2	P5423.123, sheet 2 of 2	D	New
Strain Gauge Input Module PCB Artwork	P5423.131	C	Revised
Fail Safe Digital Input Module PCB Artwork	P5423.135	B	Revised
Strain Gauge Input Module	P5423.138	C	New
Digital Input (Fail Safe) Module Certified Circuit Diagram	P5423.139, 2 sheets	B	New
Flow Sensor Input Module Certified Circuit Diagram	P5423.178, 2 sheets	B	Revised
Flow Sensor Input Module? PCB Artwork	P5423.179	B	Revised
RS 485 Comms? PCB Artwork	P5423.254	D	Revised

Title	Drawing No.	Revision	Status
S/ A of PCB, PSU	P5423-531	B	New
Flow Sensor Input Module (Rosemount) PCB Artwork	P5423.554	A	On File
Certified Circuit Diagram Flow Sensor Input Module For Rosemount DP Sensor	P5423.555, 2 sheets	A	On File
LCD Details	P5423.570	A	New

TX5630 Vibration Sensor

Title	Drawing No.	Revision	Status
Certification Marking	P5563.01	A	New
General Arrangement	P5563.06	A	New
Circuit Diagram Sheet 1 of 2	P5563.07, sheet 1 of 2	A	New
Circuit Diagram Sheet 2 of 2, BOM's	P5563.07, sheet 2 of 2	A	New
PCB, 4...20mA	P5563.08, 2 sheets	A	New
PCB, Connector	P5563.09	A	New
Zener Diode Arrangement	P5563-10	A	New

TX6145/6/7/8 (Rosemount 3051S) Sensor covered in IA-18031-0

Title	Drawing No.	Revision	Status
Coplanar & Inline Modules, ATEX Component Intrinsically Safe Configuration, Mining Group BASEEFA*	03151-1028, sheets 1 & 5 of 5	AA	On File
Schematic Coplanar Board II, 3051S*	03151-1514, sheets 1 through 5	AD	On File
Printed Wiring Board Coplanar Board II*	03151-1515, sheets 1 through 3	AA	On File
Circuit Card Assembly Coplanar Board II*	03151-1516, sheets 1 & 2	AN	On File
Schematic, Flex Circuit, 3051S Coplanar Phase II*	03151-1523	AD	On File
Flex Circuit, 3051S, Coplanar, Phase II*	03151-1524, sheets 1&2	AF	On File
Flex Circuit Assembly, 3051S Coplanar, Phase II*	03151-1525	AG	On File

Title	Drawing No.	Revision	Status
Sensor Assy, Specification Drawing*	03151-2104 sheets 1 through 3	AE	On File

TX6114 Pressure Sensor covered in IA-18031-0

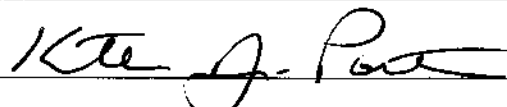
Title	Drawing No.	Revision	Status
I.S. Fuse PCB Approvals Drawing**	A2206	2	On File
Troxex (TX6) Group 1 I.S. Identification Details (Fused)**	A2216	2	On File
Cable Gland Options (Group 1 Certification, Fused)**	A2218	3	On File
I.S. Fused PCB Track Layout Approvals Drawing**	A2225	2	On File
M6420 Transducer - General Assembly (CENELEC Group 1 Fused)**	B2209	2	On File
P9420 & P6420 Transducer - General Assembly (CENELEC) (Group 1 Fused)**	B2210	2	On File
Transducer Electrical Connection Options (CENELEC) (Group 1 Fused)**	B2211	2	On File
Ceramic Pressure Sensor Schematic (Group 1 Fused)**	B2212	1	On File
4-20mA Circuit Diagram - I.S. Version**	B2213	2	On File
4-20mA PCB Component Layout (I.S. Version) (Group 1 Fused)**	B2214	2	On File
M Series 4-20mA PCB Track Layout (Group 1 Fused)**	B2215	2	On File

* Rosemount, Inc.

** Sensit

Attachments (check all that are applicable):

☒ Evaluation Report ☒ Test Sheet(s) ☐ Revised Approval Plate Design ☐ Revised Conditions of Use

Approved by: 	Date: 9-5-08
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Revised Approval Modification Program (RAMP) Acceptance issued to:

Company:	Troxel, Ltd.	Investigation No.:	IA-17501
Attention:	Mr. Kevin Stockwell	Co. Appl. Code No.:	020811
Address:	Newby Road Industrial Estate Hazel Grove, Stockport, Cheshire United Kingdom, SK7 5DY	Approval/Cert. No.:	IA-17501-0

Model(s): TX9042 Programmable Sensor Controller**Description of change(s):** The following changes are included in this RAMP:

- Rectifier diodes D101, D102, and D103 with nominal rating of $I \geq 1A$ if $V_{rrm} \geq 1000V$ are replaced by either Schottky or Rectifier diodes with nominal rating of $I \geq 1A$ if $V_{rrm} \geq 30V$. There is no risk to the intrinsic safety of the system with given that the diodes are operated below $2/3$ of their rating per ACRI2001 section 9.1.1.
- Capacity description of the Varta CR2032 battery changed from 220 mAh to 230 mAh.

<u>Title</u>	<u>Drawing No.</u>	<u>Revision</u>
Battery PCB Circuit Diagram	P5423.47	C
MSHA Drawing List for TX9042 (IA-17501)	P5423.572	A

Attachments (check all that are applicable):

☐ Evaluation Report ☐ Test Sheet(s) ☐ Revised Approval Plate Design ☐ Revised Conditions of UseApproved by: *Kevin Stockwell*

Date: Original Issuance: 10/18/2011

Revised: 12/15/2011